

**REMARKS**

The present filing is responsive to the Final Office Action.

Applicant earlier responded to the Final Office Action. The Advisory Action dated November 29, 2007 did not enter the claim amendments presented in the earlier Response after Final. The claim amendments and arguments in the present submission to the RCE replace those presented in the earlier response.

**Summary of the Response**

Claims 1, 7, 12 and 18 have been amended. Claims 1-20 remain pending in this application. Reexamination and reconsideration of the present application as amended are respectfully requested.

**Claim Rejections under 35 USC 103**

Claims 1-2, 6-12 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rottmayer et al. (US 2003/0198146) in view of Jeong et al. (US 2002/0039469). Claims 3-5 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rottmayer et al. (US 2003/0198146) in view of Jeong et al. (US 2002/0039469) as applied to claims 1-2, 6-12 and 15-20 above, and further in view of Dawes et al. (6744951). These rejections are respectfully traversed.

Independent claims 1, 12 and 18 have been amended to clarify the meaning of "width" recited in the claims. Claims 1, 12 and 18 as amended further clarify the recited width is measured in the direction of the space between the two waveguides (consistent with the

Examiner's suggestion at the earlier Interview) and the first (input) width is larger than the second (output) width. The corresponding "width" dimensions  $d_{in}$  of the input waveguide and  $d_{out}$  of the output waveguide in Jeong, as measured in a corresponding direction of the space between the input waveguide to the output waveguide, is opposite to the recited dimensional relationship. Specifically,  $d_{in}$  is smaller than  $d_{out}$  in Jeong. Accordingly, even if Rottmayer and Jeong can somehow be combined in the manner suggested only by the Examiner, such combination would not result in the recited invention.

There is no apparent reason and Rottmayer and Jeong do not contain any suggestion (express or implied) that they be combined in the first place, much less they be combined in the manner suggested only by the Examiner (which can only be made possible with the benefit of hindsight reconstruction given the disclosure of the present invention). The present invention provides a recording head that is particularly useful for heat assisted magnetic recording (HAMR) at high data recording density. The present invention overcomes the drawbacks of prior art HAMR head designs. As noted at [0007] in the specification of the present application, prior art single waveguide configuration with an output spot size that is suitable for HAMR is not suitable for efficient coupling of input from a laser. Some prior art HAMR head designs require that the slider, which supports the head, have a sufficiently large back surface area in order to accommodate coupling of the light from the laser, which competes for space with the bonding pads of the slider. These and other drawbacks of having single waveguide in prior art HAMR head structures are recognized by the Applicants, who created a novel HAMR head design that allows for efficient coupling of radiant energy into a waveguide, which does not require large surface area of the slider, and which does not substantially compete with the bonding pads for the back surface area of the slider. According to the present invention, the input waveguide has a

characteristic width or thickness larger than that of the output waveguide. The relative widths of the waveguides allow for more efficient end fire coupling of the input waveguide to an input radiant energy (e.g., delivered by an optical fiber), while providing a smaller output spot size that is required for the data recording head. By nature of HAMR, a localized area of the recording medium (e.g., in Fig. 3, spot 131 corresponding to waveguide output spot size S2) is heated to lower the coercivity of that area prior to writing data. The smaller the waveguide output spot size, the smaller the data bit and hence the higher recording density can be achieved. Further, to increase the recording density along each recording track, the present invention provides for a thin planar output waveguide having a smaller "width" as recited. Such thin film planar output waveguide could be fabricated by sputtering, to achieve a "width" on the order of 100-150nm, for example.

Jeong relates to a spot size converter with particular structural relationship between the input and output waveguides, for coupling an optical fiber and integrated devices (see, Jeong at [0001]). Jeong is silent on any application of its waveguides for data recording. Contrary to the present invention, Jeong discloses a two-waveguide structure that appears to be counter-productive to the objective achieved by the present invention, by having a thicker output waveguide. Further, more challenging fabrication steps are expected to be required to achieve the increased thickness of the output waveguide in Jeong, and in the particular structural geometry for its intended optical coupling effect.

Therefore, Jeong actually teaches away from the combination proposed by the Examiner. In any attempt to achieve the present invention, it would be necessary to make modifications, not taught or rendered obvious by the prior art, in order to combine the references in the manner suggested only by the Examiner. Accordingly, one skill in the art would not have looked to

Jeong to find the solutions that could overcome the drawbacks of the prior art, which solutions are found only by the inventors of the present invention. One of ordinary skill in the art would not have looked to Jeong for teaching of energy-coupling two waveguides in a data recording head, and specifically energy-coupling an input waveguide and an output waveguide wherein the "width" of the output waveguide is smaller than that of the input waveguide.

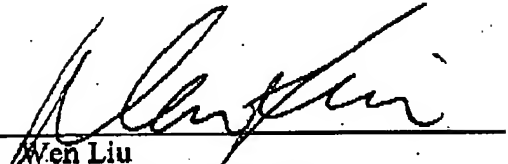
### **CONCLUSION**

In view of all the foregoing, Applicant submits that the claims pending in this application are patentable over the references of record and are in condition for allowance. Such action at an early date is earnestly solicited. **The Examiner is invited to call the undersigned representative to discuss any outstanding issues that may not have been adequately addressed in this response.**

The Assistant Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this transmittal and associated documents, or to credit any overpayment to **Deposit Account No. 501288** referencing the attorney docket number of this application.

Respectfully submitted,

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